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R E P O R T

of the

FIFTH SOUTHERN PASTURE AND FORAGE CROP IMPROVEMENT CONFERENCE

June 7-9, 1948

Mississippi Agricultural Experiment Stations

State College and Stoneville, Mississippi

JUN 29 1951

Reported by

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United States Department of Agriculture

REPORT OF THE FIFTH SOUTHERN PASTURE AND FORAGE CROP IMPROVEMENT CONFERENCE
June 7-9, 1948

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FIFTH SOUTHERN PASTURE AND FORAGE CROP IMPROVEMENT CONFERENCE
State College and Stoneville, Mississippi
June 7-9, 1948

Beltsville, Maryland
April 6, 1948

PRELIMINARY ANNOUNCEMENT OF PLANS FOR THE FIFTH SOUTHERN PASTURE
AND FORAGE CROP IMPROVEMENT CONFERENCE

At the 1947 Conference at Gainesville, Florida, the group accepted the invitation of the Mississippi Agricultural Experiment Station to meet in Mississippi in 1948. The Executive Committee of the Conference met in Washington, D.C., in February at the Association of Southern Agricultural Workers' meeting, with Director Russell Coleman, and Dr. H. W. Bennett. This group decided to hold the 1948 Conference at:

State College, Mississippi - June 7-8, 1948
and
Stoneville, Mississippi - June 9, 1948

Director Ralph W. Cummings, representing the Southern Directors, is calling a conference of representatives of the Southern States on Monday, June 7, 1948, at State College to develop a regional RMA project on pastures and forage crops. Also, a conference on Thursday, June 10, 1948, at Stoneville to organize and develop a regional project on weeds.

The College has made arrangements to house those attending the Conference in a college dormitory on the campus Sunday and Monday nights, June 6th and 7th. For reservations write to Dr. H. W. Bennett, Agronomy Department, State College, Mississippi. For hotel accommodations write directly to the Stark Hotel, Starkville, Mississippi.

For Tuesday and Wednesday nights, June 8th and 9th, write directly to the Greenville Hotel, Greenville, Mississippi, and the Leland Hotel, Leland, Mississippi. Dr. Peter Hogg, Assistant Superintendent of the Delta Experiment Station, will look after other arrangements at Stoneville.

A more detailed program for the Conference will be sent out several days preceding the Conference dates.

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Program for the Fifth Southern Pasture and Forage Crop
Improvement Conference

State College and Stoneville, Mississippi

June 7, 8, 9, 1948

State College, Mississippi

Monday, June 7, 1948

Experiment Station Building

O. E. Sell, Chairman

8:30-9:30 A.M. Registration

9:30 A.M. Special conference for the development of RMA Regional Project on production and utilization of pasture and forage crops in the South. Chairman, Director, R. W. Cummings

12:30 P.M. Lunch - Cafeteria

1:30 P.M. Field trip to Experiment Station pastures. H. H. Leveck, H. W. Bennett and associates.

7:00 P.M. Supper, as guests of the Mississippi Agricultural Experiment Station, College Grill

8:30 P.M. Welcome by the President or Dean of State College. Exploration for Forage Crops in South America Kodachrome slides - J. L. Stephens

Tuesday, June 8, 1948

O. E. Sell, Chairman

8:00 A.M. Mississippi Agriculture - Director Russell Coleman

8:30 A.M. "Ten Minute Reports" - by a member of each State in the region.

10:30 A.M. Organization of Uniform Grass Nurseries. Report of Special Committee, Dr. E. N. Fergus

General Discussion - Glenn Burton, R. L. Lovvorn, V. Hawk, R. C. Potts

12:30 P.M. Lunch - Cafeteria

3:30 P.M. Field trip to Forage Nurseries and Breeding Plots. H. W. Bennett and associates

4:00 P.M. Start drive to Stoneville on U.S. Highway 82. Markers for soil types and one or two stops for demonstration will be noted enroute.

(Continued)

Stoneville, Mississippi

Wednesday, June 9, 1948

Delta Experiment Station

O. E. Sell, Chairman

8:00 A.M. Report by Committee on Uniform Grass Nurseries.
E. N. Fergus

Evaluating Pastures and Forage Crops with Livestock.
General Discussion. - E. Marion Brown, R. K. Waugh,
Peter Hogg.

11:00 A.M. Station Machinery and Facilities -
Superintendent Sayre and associates

12:30 P.M. Lunch - Leland

2:00 P.M. Field trip to Station forage plots and experimental
pastures.

7:00 P.M. Dinner - as Guests of the Delta Council

Thursday, June 10, 1948

Delta Experiment Station

R. W. Cummings, Chairman

9:00 A.M. Organization of a Regional Weed Conference. Program being
developed and notices sent out by Director Cummings.

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General

In the past, many members attending the Regional Conference
have arranged to visit outlying field stations on their
return trip. The Mississippi Station will provide guides
and perhaps some transportation for those wishing to include
any outlying field stations in their travel itinerary this
year. The Stations suggested are as follows:

North Mississippi Branch Station . .	Holly Springs
Black Belt Branch Station	Brooksville
Brown Loam Branch Station	Oakley
Natchez Pilot Farm	Natchez
South Mississippi Branch Station . .	Poplarville

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FIFTH SOUTHERN PASTURE AND FORAGE CROP IMPROVEMENT CONFERENCE

State College and Stoneville, Mississippi

June 7-9, 1948

Monday, June 7th:

Experiment Station Building

O. E. Sell, Chairman

Following registration and renewal of acquaintanceships among members of the Conference, the Chairman called the meeting to order. Since the first day was to be devoted to a consideration of the RMA Regional Project on production and utilization of pasture and forage crops in the South, the Conference was turned over to Director R. W. Cummings of North Carolina.

The primary activity at the morning session was reports by the various sub-committees appointed at the 1947 meeting at Gainesville, Florida. The sub-committee reports were reviewed in detail by the Conference group. Revised statements were prepared for submission to the Regional Directors, and distributed to the State and Federal representatives concerned with the RMA Regional Program. Reports of four sub-committees were combined into a general report by a special committee consisting of R. L. Lowvorn, Glenn Burton, E. N. Fergus, Peter Hogg, and Robert Lush.

1:30 P.M. Field trip to Experiment Station pastures

The Mississippi pasture workers were introduced to the group. Mr. Johnson, cooperating with the State, is working on the Piney Woods Project at Poplarville. He also is testing adaptability and seasonal production of pasture and forage species. Mr. J.B. Gill is carrying cooperative grazing and feeding trials with farmers. Special emphasis is being placed upon grazing crops with and without supplemental feeding. Results to date have shown that more profit is realized from grazing winter cereals alone than from grazing plus feeding or barn feeding. Messrs. Gill and Johnson are also endeavoring to determine the best methods, combinations, etc., for joining range grazing with improved grazing. Mr. Russell Landrum of Holly Springs is also working with winter grazing for beef and dairy cattle and supplemental crops for increasing length of grazing period. Mr. J. L. Anthony of the Main Station is working with fertility studies having as their objective rates and time of application. He also is conducting sources of phosphorus tests. Mr. M. D. Finkner is charged with renovation studies coupled with seeding, fertilizers, and mowing. Summer and winter production trials with species and species mixtures are also his responsibility. Mr. H. W. Bennett is charged with the agronomic phases of the grazing systems being studies in cooperation with the Animal Husbandry Department. These systems are endeavoring to determine crops to be used, carrying capacity, grain hay or seed yields following grazing, and fertility requirements for attempted year-round grazing. He also is charged with fertilizer placement studies with pasture and forage crops.

One of the major difficulties in beef production in Mississippi is that of providing sufficient high quality grazing, over as long a period as possible, and the establishment of permanent pastures for this purpose is accepted as the first requirement for success. Such pastures, however, are expensive, and land suitable for pasturage is often a limiting factor.

Another major difficulty in beef production is the necessarily large number of beef animals -- with the attendant problem of pasturage and feed production -- which are required to yield an attractive income to the producer.

In this connection, it seems quite important to note the increase in value of calves attributable to winter grazing.

Calves given winter grazing in the 1945-46 season increased in value approximately 50 percent, while calves given winter grazing in the 1946-47 season approximately doubled in value.

All factors considered, the results of this experiment to date indicate that excellent winter grazing is a profitable practice in beef calf production, enabling the producer to realize from 50 percent to 100 percent more from his fall-weaned calves.

7:00 P.M. - Monday

Monday evening the entire Conference group were guests of the Mississippi Agricultural Experiment Station at a dinner. The group was welcomed by President Mitchell and Director Coleman. Appreciation for courtesies and hospitality the Institution provided to the members of the Conference was expressed by Dr. O. E. Sell, and Director Cummings. Following the dinner the group moved to the auditorium where Mr. J. L. Stephens of the Tifton Experiment Station gave an address on "Exploration for Forage Crops in South America." Mr. Stephens' observations and comments were illustrated with a number of kodakrome slides showing the various environments and conditions under which he did his exploratory work.

A short description was given on how Department of Agriculture representatives collect plant material in foreign countries. The contacts with American Embassies or Consular services, meeting the key scientific personnel of the country being visited, and use of libraries and herbarium specimen to get the general location, habitat and characteristics of plants to be collected.

A brief description of soil, topography, climate and flora was given. The countries reported on where collections were made on this trip included Argentina, Bolivia, Uruguay, Paraguay and Brazil.

About 300 color slides were shown. These slides included the above countries and in addition, pictures made in Peru, Trinidad, and the Amazon.

8:30 A.M. - Tuesday, June 8th

Experiment Station Building

O. E. Sell, Chairman

The Conference opened with an address of welcome from the Director of the Mississippi Experiment Station, Russell Coleman.

The Mission of the Agricultural Experiment Stations is to acquire information that farmers may use to become better farmers; to produce more abundantly and more economically, to utilize their resources in

land and other facilities most advantageously, and so increase efficiency in the business of farming that they may lead more secure and more abundant lives.

In this big and highly important endeavor, the Mississippi Station has sought to live up to its mission throughout these fifty-nine years. A great change has come over Mississippi agriculture during the same years -- a change for the better. We no longer lament "worn-out" soils; we know how to make them produce, more in some cases than in their virgin state. We no longer dump cottonseed in streams, or bury them, or boil them for the stock to eat; cottonseed is now our second cash crop. We have much additional information about how to build pastures, and what forage crops to grow, and how to grow them. Not many farmers jeer at "book farming" anymore; the most progressive and successful farmers today are those who most carefully study the results of research.

To acquire information is easily said, but not always easily done. The field of agricultural research is as wide as the field of agriculture -- crops, livestock, poultry, forestry, farm and home economics, disease and insect control, new varieties, new machinery, new processes, to name a few. Research projects range from simple variety comparisons to complex and highly technical programs such as the breeding of cotton, which was started at the Mississippi Station in 1910, and will doubtless continue as long as cotton is produced. Results may come quickly, or they may be heart-breakingly slow. The ammonia process for nitrogen fertilization, for example, was worked out and fully tested in the field in less than four years; whereas, over many years our workers have made some 400,000 hand pollinations, and are just now getting corn hybrids that are significantly better than the best of the old established open pollinated varieties.

The Mississippi Station has grown to be a big organization. It is conducted through a carefully integrated program of research at the Central Station at State College, and by branch stations at Stoneville, Holly Springs, Tupelo, Brooksville, Newton, Oakley, Crystal Springs, Poplarville, and experimental pilot farms at Natchez and West Point.

Brief Description of Soil Areas located in North Mississippi H. B. Vanderford

As background information, those attending the Conference were presented with small State soil maps, and a brief description of the soil areas located in northern Mississippi as prepared by H. B. Vanderford as follows:

1. Flatwoods -- This is a narrow area that is flat to gently rolling and the soil developed from soapstone (acid shale and silty clay) and under loblolly pine vegetation. The nature of the parent material and the poor drainage conditions cause the soils of this area to be low producers of cash crops. Pine timber, pasture, hay crops, and row crops in the bottoms are adapted to the soils of this area.
2. Sand-Clay Hills -- This area is rather narrow in North Mississippi and is characterized by rolling to steep and rugged topography. The soils developed from coastal plain sands, sandy clays, and lignitic clays, and shale and under a mixed vegetation of shortleaf pine and

hardwoods. The soils because of their physical properties have a wide adaptation for crops but are low in natural fertility. The rugged topography and past management have induced severe accelerated erosion. Consequently, many small farms on which the operators are practicing a general type of agriculture. The principal crops of this area are cotton, corn, hays, pasture, and pine timber.

3. Mixed Brown Loam and Coastal Plain -- The soils of this area developed from shallow wind blown deposits over coastal plain sediments of variable texture. The topography is rolling to steeply rolling and the soils developed under a mixed type of vegetation similar to that found in the Sand-Clay Hills Area. The wind blown material is generally higher in fertility than the sandy coastal plain materials, but the high rate of weathering has depleted the natural fertility considerably in this area. This area is adapted for general and specialized types of agriculture. The principal crops are cotton, corn, hays, pastures, and special crops like lespedeza for seed and truck crops.
4. Brown Loam (Loess or wind blown) -- The soils of this area developed from silty windblown materials relatively high in lime and other minerals. The topography is gently rolling to steep and rugged and erosion has dissected much of the steeper land. The soils developed under a deciduous type of vegetation and are well adapted for a variety of crops. The physical properties and the fertility level of the soils make this area suited for diversified farming. Livestock and general farming are the type practiced generally.
5. Delta (Alluvial Soils) -- The soils of this area developed from sediments deposited by the Mississippi River and other streams. These sediments are comprised of soils and soil materials from Northern and Western States, as well as throughout the Mississippi Valley. The fertility level of the soils is high and the topography is almost level which makes artificial drainage necessary over most of the area. With proper drainage, the soils are the most productive in the State, and nitrogen is the limited nutrient element. Because of the productive power of the soils and the topography, a specialized type of agriculture is practiced. Cotton is "king" of the crops grown and soybeans, small grains, and hays are grown on the land less suitable for cotton. Mechanization in agriculture has advanced more in this area than any section in the South.

State Reports on Highlights and Special Activities
during the past year

Virginia - T. J. Smith: (3 representatives)

The primary forage interest in Virginia is in alfalfa, followed by red clover and orchard grass. Alfalfa stands at present are short-lived, usually three years. The main factor shortening the life of stands is probably pathological. The primary diseases -- Sclerotinia rot, Southern Anthracnose, black stem, and leaf spots.

Kentucky - L. Henson: (2 representatives)

The legume work in Kentucky is concerned with red clover. The latest development is the production of Kenland, developed from selections started in 1936. Seven old stocks were used as parents. At Lexington, Kentucky, Kenland usually doubles dry matter yield and maintains good stands into the third year. Some preliminary selection of alfalfa and Ladino clovers is under way. The grass work is centered around K-31 Tall Fescue. The primary value has been in its use in pasture improvement. There is a varied viewpoint on palatability and utilization. Selection work is being carried on. Dr. Fergus reports there will probably be 5 million pounds available this year at a price of about 75 cents. Some work is being done on Orchard and Brome grasses.

Tennessee - J. K. Leasure: (6 representatives)

Improvement work is being done on Orchard, Tall Fescue and Brome grasses. The legumes receiving primary attention are red clover, crimson clover and alfalfa. Some attention is also being given to alfalfa seed production. Flourine fumes are a serious problem at the Columbia Station in grazing experiments.

North Carolina - R. L. Lovvorn: (8 representatives)

Management:-- It is estimated that Ladino clover is now being grown on 100,000 acres in North Carolina, most of which has been seeded within the past three years. Adaptation studies include legume -- grass associations of Ladino, white clover, alfalfa, big trefoil and birdsfoot trefoil with tall fescues, orchard grass, redtop, bromegrass, and Dallis grass.

A pasture evaluation -- technique project has recently been initiated in cooperation with the dairy research workers in which three pasture mixtures are being studied under four systems of grazing management. Results are being obtained in terms of dairy heifer gains, rabbit gains, agronomic yields, botanical analyses and chemical composition taken both from the grazing paddocks and supplementary adjacent plots.

Fundamental ecological studies include the above and below ground relationships between alfalfa and orchard grass.

Soil Fertility: -- The major emphasis in fertility work with forage crops in North Carolina is on determining the nutritive requirements of the more important forage legumes. Emphasis is being placed on alfalfa, Ladino clover and big trefoil. We have one potash and one boron fellow working in this field. Placement of lime and fertilizers is being investigated. Some expansion in this field is contemplated as well as in the use of nitrogen to increase winter grazing and the effect of grasses upon the fertilizer requirements of legumes.

Breeding:-- During the past two years data have been gathered on approximately sixty annual lespedeza accessions obtained through the Division of Forage Crops and Diseases. A wide range in maturity dates, resistance to powdery mildew and resistance to the root knot nematode have been found in that material. One of our objectives will be to transfer resistance to these organisms to later maturing strains.

Our alfalfa breeding work is being carried on cooperatively with the National Alfalfa Improvement Conference. It is apparent that only through cooperative testing and exchange of materials will varieties be developed which will be adapted to conditions of the East and the seed producing area as well. The most important diseases in North Carolina appear to be the leaf spots, black stem, Sclerotinia and southern anthracnose. There is some evidence that aphid damage can be reduced by breeding for resistance.

Atlantic alfalfa has given slightly higher yields than other standard varieties.

Cytological: -- The species Paspalum dilatatum consists of at least three cytologically distinct types. Each of these must be equally distinct in its breeding behavior. We have examined the meiotic divisions in pollen mother cells of four genetically different strains. The common type (Domestic or Australian), and the Tifton leafy type (Burton's D-1) have an irregular first division with lagging chromosomes at anaphase. Variety pauciciliatum (stoloniferous) is even more irregular with a larger number of laggards. The Uruguay yellow-anthered type has twenty pairs of chromosomes at metaphase with normal separation.

The cytological results clearly suggest that the origin of Dallis grass involved interspecific hybridization and probably the two cytologically irregular types studied represent two different hybrids. This hypothesis requires proof which will not be forthcoming until we have located the parents, at present unknown, and produce experimental hybrids which resemble Dallis grass. The Uruguay yellow-anthered type with normal chromosome behavior may be one of these parents, but it is also possible that this type is similar in origin to the others.

South Carolina - No representatives, or report.

Georgia - Glen Burton and O. E. Sell (§ representatives)

Informal report made at the Southern Pasture and Forage Crop Conference dealing with grass research underway at Tifton, Georgia.
Glenn Burton

Coastal Bermuda has continued to be outstanding in its performance both for hay and pasture purposes. In a nitrogen fertilizer test conducted last year the check yield of approximately one-and-one-half tons of hay per acre was increased to six-and-nine-tenths tons of hay per acre with the application of 400 pounds of nitrate of soda nitrogen. The application of 400 pounds of nitrogen per acre increased the protein content from 7.4 percent to 13.1 percent for the total seasonal average. This treatment gave an acreage production of 1629 pounds of protein. Uramon, ammonium nitrate and nitrate of soda were equally effective in increasing yields and protein content. The possibility of producing part of this nitrogen with lupines has been under investigation for the past two years. By drilling 60 pounds of lupine seed with an ordinary grain drill into undisturbed sod immediately after a rain in the fall, it has been possible to produce excellent stands and very satisfactory growth. Lupines planted in this way on October 8, 1947, had produced

eighty pounds of nitrogen per acre by March 8th, and 115 pounds by April 1, 1948. Disking the lupines in appears to be as effective as turning them under. Hay yields were increased threefold by this practice in 1947.

Many attempts to hybridize our leafy D-1 Dallis grass selection with a highly fertile yellow anthered selection from Uruguay finally resulted in two hybrids. The progeny of one of these hybrids, grown in 1947, segregated greatly giving plants ranging from complete sterility to a high degree of fertility. The breeding behavior of some of these plants is now being studied.

Pensacola Bahia hybrids produced by allowing two self-sterile clones to cross naturally have shown a wide range of yield performance. Some of them have out-yielded open pollinated Pensacola Bahia by a substantial amount. A Pensacola x Common Bahia hybrid that combines some of the desirable characteristics of both plants may be more useful than the Pensacola hybrids because of its greater palatability. Some of the best hybrids are being increased for further testing.

In the Sudan grass breeding program an attempt is being made to combine the disease resistance of Tift Sudan with the low prussic acid of the Wisconsin selections, the seedling vigor of Common Sudan, and the desirable seed and forage qualities of Sweet Sudan. Crosses which should result in the combination of these characteristics have been made. Sixty thousand segregates from such crosses were grown in 1947. Due to the lack of a satisfactory disease epidemic it was necessary to select many more plants than ordinary. Selfed progenies of 1500 selected plants in this segregating material are being studied at Tifton and Beltsville in 1948 in an effort to determine if any of them carry the desired combination of characters.

Breeding work with Cattail Millet is being continued as in the past. Efforts are being made to develop late maturing strains and hybrids which will be short enough to facilitate seed harvesting. Much of the breeding work is directed towards the development of commercial F_1 hybrids as in corn. Progress is being made towards the achievement of these objectives.

In the Piney Woods revegetation studies that are being conducted co-operatively with the Forest Service, an effort is being made to find grasses and legumes that can be successfully grown in the cut-over range. Methods of establishment and fertilizer requirements for maintenance are being studied.

A project on turf research was begun a year ago in an effort to solve many of the problems that are associated with growing satisfactory turf in the Southeast. This project is being financed largely by interested Golf Associations in the Southeast.

Georgia Pasture Progress, 1947-48

O. E. Sell

I. The Past Year:

- A. Winter grazing problem received most emphasis. There are three general types of winter grazing, each with special problems and each into different farm programs and facilities.

I. The Past Year - Continued

1. Perennial grass. Tall fescue has great possibilities, orchard grass and smooth brome also. Concentrating on tall fescue grass.
 - a. Seeding date - fall only is satisfactory except in north Georgia.
 - b. Many legumes for association under test - crimson clover outgrows fescue first year and reduces stand.
 - c. Year-round grazing possible in north Georgia with good practices. Dairy cows liked fescue and produced milk on it as well as on temporary winter grazing mixture.
 - d. High N topdressings (not less than 48 lbs. N per acre) are desirable for establishment and seed production; also to help crowd out weeds such as wild garlic.
 - e. Rye grass and weed admixture disappointed many first year fescue growers - couldn't certify their seed.
 - f. Many new strains under test, none outstandingly better, a California strain was not winter hardy in north Georgia.
 - g. Many farmers have grown rye grass for winter grazing stands of fescue seeded on such land is severely reduced - too much rye grass seed.
2. Annual reseeding plants -- Dixie crimson - frequently when seeded on new land, inoculation is ineffective. Must reinoculate. Finding failures due to improper fertility. Acreage of Dixie is expanding rapidly but not as fast as unidentified and uncertified strains. Out of state buyers may or may not be safe in buying Dixie-type crimson.
3. Temporary mixtures -- such as oats, rye grass, crimson clover.
 - a. Seeding date - August for north Georgia and September for central Georgia.
 - b. Moderate seeding rate plus 48 or more pounds N superior to heavy seeding rates and a minimum of N.
 - c. Need new oat varieties for early planting for winter grazing.
 - d. 500 pounds 10-10-10 fertilizer at seeding time greatly stimulated early growth -- had over 200 pounds protein per acre by late November.
 - e. Clipping frequency - every two weeks was too often in fall and winter, not in spring - suggests grazing intensity should be varied. Got little growth late December than February - emphasize^{es} need to get and accumulate growth in fall.
 - f. Oat yields were materially reduced, even by early termination of clipping. Indicates cannot get grazing without reducing oat grain yields.
- B. Alfalfa - found stem nematodes on one farm and Sclerotinia on another farm thinning stands. Alfalfa responded to Cu in one test in Piedmont.
- C. Smooth brome grass - looks promising in limited plantings - still prevalent in one three year old stand. A fair number of new plantings will be made this fall - mostly dairymen.
- D. Garlic control - work started with tall fescue well fertilized and not grazed looks promising. In a test with 5, 10, 50 gallons per acre

I. The Past Year - Continued

nozzles using different cones, of 2,4D, found that amount of 2,4D applied must be 2.5 to 3 pounds for control, regardless of gallonage and concentration of 2,4D.

II. The Coming Year

- A. A white and Ladino clover breeding project has been initiated. A first step will be the collection of as many thousands of clover or strains from old pastures and other sites all over the South and elsewhere.
- B. State-wide grazing and small plot experiments are to be started to determine best pasture mixtures for various parts of Georgia, and the fertilizer and lime needs on different soil types for pasture establishment.
- C. Special equipment is being developed to increase the accuracy, speed, and possibilities in pasture research.
 1. Cattle weighing scale - one that can be set up, dismantled, and hauled anywhere without damage and little difficulty. Needed for cooperative pasture-livestock research with farmers, and special pasture - livestock studies.
 2. Special sickle bar type mower for clipping experimental plots.
 3. Special spring, hanging type scale for easy, quick, and accurate field weighing.

Florida -- Brief statements were made by Messrs. Killinger, Hodges, Ritchey, White, and Warner (5 representatives)

Alabama -- Hayden Rogers (5 representatives)

The primary interest in Alabama is in alfalfa. With proper fertilization and management, this forage crop can be grown successfully in many parts of the State. The primary need is potash at 400 to 600 pounds per acre. Borax is second in importance. Alfalfa has been used to advantage for winter grazing. Summer grazing is obtained from Lespedeza sericia and Kudzu. The hard seeded Crimson clovers are of real value. The present price for the re-seeding type is near 60 cents per pound. The Auburn strain is exactly the same as Dixie. This clover is very valuable in southern Alabama when grown with Bermuda grass. It has also done well with sericia.

Mississippi - H. W. Bennett (15 representatives)

The general program and problems will be observed and discussed in the field at both State College and Stoneville. The work and problems at other stations are reviewed briefly. Fertilizer requirements of pastures and forage crops, Piney Woods Range, renovation systems, etc., were mentioned as current activities in the State.

Louisiana - C. R. Owen (4 representatives)

There was a brief discussion of Dallis grass improvement program. One of the types was described as follows: "Some Dallis grass types are like bald headed men -- bare in the middle with a little fringe around the edge." The selection program with White and Ladino clovers was briefly reviewed, and also brief comments on improvement and adaptation of Louisiana red clover.

Arkansas - W. H. Garman (2 representatives)

One of the primary activities in Arkansas has been the production of Vetch seed free from weevils. This past year they produced more seed than the state of Oregon. Most of the land needs to be put to productive use. Mr. P. C. Sandal, in Charge of Pasture and Forage Crops, indicated a great increase in improved pastures in Arkansas in recent years. Primary grass is Bermuda, with Hop, White and Lespedeza clovers. Sudan is used in late summer, and small grain for winter pasture. Tall Fescue pasture was being tried this year. Also Love grass and Brome. Fertility studies are being conducted in conjunction with these grasses and legumes. The breeding work has been curtailed for the present.

Texas - Robert R. Lancaster (5 representatives)

Enumerated in detail, the forage stations in Texas with an outline of the major problems in the State.

Oklahoma - Melvin D. Jones (2 representatives)

The state of Oklahoma is located in the transition zone between East and West, and North and South. The rainfall varies from 16 inches in the Panhandle to 45 inches in the Southeast. The northern border of Oklahoma marks the limit of the area in the Great Plains in which winter oats and barley can be successfully grown for pasture and grain.

The most important forage legumes with which breeding is being conducted are alfalfa, lespedeza and soybeans. The alfalfa seed industry is a two-million dollar enterprise in the State. The primary breeding objectives are to produce a wilt resistant, winter-hardy variety since the bulk of the State's seed crop moves to the northeastern United States, an area where wilt and winter-hardiness are limiting factors in alfalfa production.

Climax lespedeza has proved to be the best forage lespedeza and is also among the top seed producers.

The grasses of importance in Oklahoma can be divided in two groups, namely: the native and the tame. The following seven native species, we feel, are worthy of extensive individual investigation: Buffalo, Little Bluestem, Switch, Side-oats Grama, Big Bluestem, Sand Lovegrass, and Blue Grama. The first four are being investigated at Stillwater, Oklahoma. At the Southern Great Plains Field Station, Woodward, Oklahoma, Mr. D. A. Savage and Dr. J. R. Harlan are investigating Buffalo, Blue Grama, Side-oats Grama, and Sandhill Bluestem. Bromegrass, Bermuda, Sudan and Weeping Lovegrass are tame grasses that are of greatest importance in the State. Bromegrass appears to have some possibilities for the

northeastern section of Oklahoma and is being studied most intensively at this time. Bermuda and Sudan have played a great part in the State's pasture industry for many years. Weeping Lovegrass has become important in the last five years. For the last three years there has been an annual seeding in the State of 15,000 to 20,000 acres of this grass.

Pasture studies are being conducted at a number of stations. Extensive range studies are being conducted by Mr. Savage and associates at Woodward. Pasture fertility and grazing studies are being conducted at Coalgate. Grazing studies on native pastures are underway at Stillwater.

Lespedeza, White Dutch, Little and Big Hop clovers are being used effectively in pasture mixtures. The hop clovers seem to do quite well in areas where it is too dry for White Dutch.

Methods of regrassing eroded and abandoned farm lands are receiving careful study at a number of points in the State.

This year a turf program is being initiated.

United States Forest Service - Reports on Forest Range seeding and grazing management in the Piney Woods area - R. S. Campbell

The half of the South's land in forests is attracting increasing interest as a source of cheap range forage. This range resource provides reasonably good grazing during spring and early summer and usually in early fall. Nutritive values are only fair during the dry mid-summer season, and far below maintenance in winter. Forage is more abundant in the blue-stem and wiregrass types in the long-leaf-slash pine forests along the Coastal Plain than in the loblolly pine and hardwood forest belts of the Piedmont and uplands. Prevailing use of southern forest range is largely without management of kind, numbers and distribution of animals or season of use. Resulting production is far below that possible under good range management and poses many problems to the livestock owner, the pasture expert and the forester. Exploratory studies and experiments aimed at improving the use of forest range are being conducted at several places in the South by the Forest Service in cooperation with the Bureau of Animal Industry, Bureau of Plant Industry, Soils, and Agricultural Engineering, and the state experiment Stations.

Forest grazing management studies with beef cattle to determine grazing capacity, nutritive values, best seasons of use, and winter feeding are being conducted in the Coastal Plain in North Carolina, Georgia, Florida, Mississippi, and Louisiana. Additional studies of range forage production and use in relation to timber management are located in South Alabama and the Arkansas Ozarks.

Studies of "Piney Woods Seeding" are under way in Georgia, Florida, Mississippi, and Louisiana. This work involves determination of (1) Species adapted to forest range conditions, (2) Seeding and fertilizing treatments, (3) Control of undesirable hardwoods and brush prior to seeding, and (4) Grazing of seeding ranges.

It aims at three practical objectives: (1) Extending the range grazing season through the mid-summer dry season, (2) Possibly developing late fall or winter grazing, and (3) Developing grazed firebreaks through the forest for use in fire prevention and suppression.

Additional studies are needed to develop systems of yearlong grazing that will better integrate forest grazing with permanent and temporary farm pastures and supplemental feeding, as well as with timber growing.

3:30 P.M. Field trip to the Forage Nurseries and Breeding Plots
H. W. Bennett and associates

Johnson Grass Selections:

The strains growing at State College were transferred from West Point the third year from space planting commercial lots of seed. Criterion used for bringing strains was the production of culms per plant the first year. Studies the following years have shown that the size and number of culms per plant varies only slightly from season to season. Height per plant varies considerably from season to season, but is also a comparative plant characteristic. Weight per plant varies from two to eleven pounds per plant with thirty-nine percent yielding five pounds or more per plant. Self-fertility varies from none to good. If the population 12.9 percent were self-fertile, 7.4 percent were poor, and 78.7 percent had no self-fertility. Fertility studies were made under Manila bags only. Great differences were shown in ability to withstand mowing. Yield and persistence under mowing are not correlated with any plant characteristic. Smut is evidently linked with stigma color. Every plant with pink stigmas is heavily infested with smut. Considerable variation exists in the degree of leaf-spot damage.

Kudzu Plantings:

Kudzu crowns were obtained in 1947 from eleven sources and spaced six feet in the field. These were sprayed two times during the season with Halo-blight inoculum and readings made for resistance or susceptibility. Almost one-half of the population showed resistance to this disease. Plant-type was found to vary and fifteen upright very-vigorous types were found. Of these types ten were glabrous. These are being increased vegetatively to test palatability and yield.

Johnson-Sorghum Hybrids:

Selfed seed of Hodo sorghum female and Johnson grass male were spaced-planted at West Point in 1944. In 1945, 16.6 percent of the population were annual. The following year 6.5 percent of the original stand died. This gave 76.9 percent of the population as perennial types. Steers were allowed to selectively graze the 1946, population of 2546 spaced plants. One hundred fifteen of these were grazed to the ground twice during the season. The grazed plants and selfed progeny were shown the group June 8th. Of the one-hundred-fifteen strains brought to State College, eleven showed minimum segregation. Seed size was skewed toward the Hodo parent. Johnson grass numbered 169,400 per pound, hybrid 67,741 per pound, and Hodo sorghum 39,010. The hybrid proved sixty-two percent fertile and averages of Johnson grass were sixty-nine percent

fertile. A composite sample of the hybrid showed one-half extraction as given by Hodo sorghum and the total carbohydrate the same. Seed colors varied from white (straw) through red, brown, to black. All material was selected for short-stubby rhizomes rather than the Johnson type.

Dallis Grass Hybrid:

The original hybridization produced five Paspalum dilatatum x P. malacophyllum hybrids. These F₁ plants produced some segregates with considerable fertility. These F₂ segregates also were somewhat fertile and their progeny the F₃, were showing further segregation. Selections at present are being made on fertility alone.

Wednesday - June 9th:

Delta Experiment Station

O. E. Sell, Chairman

The meeting opened with a brief welcome by Superintendent C. R. Sayre. At the 1947 meeting there was a symposium "Uniform testing of important grasses in the South." Following discussion, a special committee was appointed to prepare and present at the 1948 meeting a report on the "Testing of Pasture and Forage Grasses in the South, and the uniform reporting of Results." The report submitted by Dr. E. N. Fergus, Chairman of the Committee is as follows:

Committee Report to Southern Pasture and Forage Crop
Improvement Conference, State College, Mississippi, June 8-9, 1948
on

Testing of Pasture and Forage Crops in the South and the
Uniform Reporting of Results

Recommendations

1. That the testing shall include forage legumes and grasses.
2. That the testing shall be broadened to include new material for turf and for cover crops.
3. That only the species and variety recommended for trial by an Experiment Station or Seed Organization will be considered in these tests.
4. That the sponsor of the new material shall supply the seed, describe and indicate probable usefulness of the release.
5. That a variety selected by the local station shall be used consistently by that station as a check variety in addition to the check variety.
6. That commercial seed shall be included in the tests.
7. That the varieties of each species shall be evaluated against each other -- that is, that the test shall be laid out in blocks according to species or similar species.
8. That occasionally the superior varieties of different species shall be evaluated in an inter-species test and in the advance test.

9. That each entry shall be seeded in replicated and randomized plots of such size and in such design at each location as shall be preferred by the local station.
10. That observational readings shall be rated 0 to 10 in respect to each quality evaluated (0 = the perfect plant, and 10 ; most unsatisfactory in test.)
11. That yields shall be measured in pounds of moisture-free dry matter per acre.
12. That seed for the tests shall be distributed by _____.
13. That report forms shall be prepared and distributed by _____.
14. That reports summarizing the state reports shall be compiled and distributed by _____.
15. That the testing procedure and the criteria of evaluation be as follows:
 - I. The preliminary test (initial planting of sponsored material).
 1. Kind of plot -- size 5 x 10 suggested; two replications preferable.
 - a. Solid cover for crops commonly grown in solid stands.
 - b. Row -- for crops commonly grown in rows.
 2. Criteria of value
 - (1) Survival. Cause of death.
 - (2) Soil adaptability.
 - (3) Aggressiveness.
 - (4) Disease and insect resistance.
 - (5) Drought resistance.
 - (6) Frost resistance
 - (7) Other
 - II. Standard test.
 1. Kind of plot (not less than certain size (2 x 10 ?)), size 5 x 20 or larger; four replications.
 - a. Solid cover
 1. Pure stands
 2. Mixture
 - b. Row -- for crops grown in rows.
 2. Criteria of value.
 - a. Observations
 - (1) Aggressiveness.
 - (2) Disease and insect resistance
 - (3) Drought resistance
 - (4) Heat resistance
 - (5) Frost resistance
 - (6) Length of crop's growing season
 - (7) Recovery after clipping
 - (8) Compatability with other species
 - (9) Palatability
 - (10) Tolerance to shade (turf)
 - (11) Tolerance to wet soil
 - (12) Turf value
 - (13) Cover crop value

b. Measurements.

(1) Yields

(a) Forage -- seasonal and total

(b) Seed

(2) Chemical analyses

III. Advanced test -- pasture crops only.

Determination of final value of varieties for pasture will not be part of cooperative testing and uniform reporting but will be left to individual states.

The above Report, with slight amendments and modifications included, was approved as an interim report with the recommendations that the Division of Forage Crops and Diseases of the U. S. Department of Agriculture give consideration to taking on the responsibilities under items 11, 12, and 13. O. S. Aamodt indicated that the Division of Forage Crops and Diseases would be glad to cooperate to the extent of available personnel, finances and facilities. At present there would be very little opportunity to expand the Division's activities into this field, because of shortage of personnel and funds. It was hoped that new funds would be forthcoming for such work in the near future under the RMA program. At such time, detailed consideration would be given to the request of the Conference.

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The Nominating Committee consisting of Messrs. E. N. Fergus, R. L. Lovvorn and Hayden Rogers, reported as follows:

New Members for the Executive Committee -

C. R. Owen of the Louisiana State University

Paul R. Henson, Permanent Secretary of the Conference, Plant Industry Station, Beltsville, Maryland. Approved unanimously

T. J. Smith of the Virginia Agricultural Experiment Station, Blacksburg, Virginia, was nominated as Chairman for 1949.

This was approved unanimously.

The Chairman of the meeting indicated that the Conference was open for suggestions as to place of meeting in 1949. Director Ralph Cummings of North Carolina extended an invitation for the Conference to come to Raleigh in 1949. The motion to accept the invitation was made and unanimously approved.

The Chairman called for a standing vote of appreciation to O. S. Aamodt for his help in organizing the Southern Pasture and Forage Crop Improvement Conference, and for his many years of active and successful work as its Secretary. Approved unanimously.

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Symposium on "Measuring Pastures with Livestock"

E. Marion Brown

Doctor E. Marion Brown of Columbia, Missouri outlined the problem and needs. He first pointed out that there were other ways to measure pasture than with livestock. Plot tests with harvested samples gives a good imitation of possible values. Minimum plot acreage when measuring with livestock would be around five to ten acres in order to provide herbage for several animals. The grass should be grazed to full capacity during the flush period, with reduced rates in dry periods when the animals should be moved to supplementary pasture with reserves. Some of the pasture problems concerned with the animals should be coordinated closely with the livestock specialists and under their supervision. The agronomic problems are such that the livestock should be under the control of the agronomists when in the field. In order to use the livestock as a measuring device, the agronomist must have control. Supplementary feed is not desirable as far as evaluating the forage is concerned. Two year old beef animals are preferred. Poor animals in responding to the forage should be replaced. He would not advise using the same animals in rotation on different plots, since a change to different pastures in itself makes a difference in the results. The pastures should not be overgrazed to obtain maximum production per acre. Reserve cattle for replacement should be kept in a general pasture.

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Following the excellent presentation by Dr. Brown on problems encountered in measuring pasture with livestock, there was a very constructive and informative discussion in which practically all members of the Conference took part. Some of the more pertinent comments are as follows:

1. Does it cost more to put in more cows or provide more pastures? There is a need to strike a practical and economical balance.
2. Cost can be reduced by use of electric fences. A forty acre field can be very cheaply divided into eight 5 acre fields for three cows per field.
3. How does one arrive at a five acre field and three cows as a suitable measure of the pasture? It was pointed out that to date this was accomplished primarily by practical judgment and experience.
4. There is no rule of thumb for supplementary feeding of animals on pasture. Adjustment in feeding will be required for variation in forage available in different pastures, and to meet seasonable conditions. Experience of both Agronomic and Livestock specialists will be required to work out a practical procedure.
5. Dry matter is not a good measure of yields of forage for dairy cows. Succulence and moisture needs to be considered. Kentucky bluegrass with 50 percent or 80 percent moisture had a big difference in Lignin content.
6. Screen the forage plants in terms of how much good it will do the animals.

7. Base feed requirements on T.D.N.
8. T.D.N. requirements in the barn, and T.D.N. requirements on the pasture are entirely different. Lignin ratios are important.
9. Why not use supplements in order to obtain the pasture yields, or why not standardize at a 15 percent minimum protein level?
10. How would one determine the kinds of variables to be studied? For example, the variety of oats in a grazing test. It was suggested that the best procedure would be the use of several varieties and mixtures and take samples under cages. The entire area could then be grazed off with a common herd to get trampling and manuring effects. The moisture should be determined according to the practices in the area.
11. Dairy men are used to changes in varieties, practices, etc., while the beef men do not change soon enough. Experimentally it may be desirable to carry through with an experiment even though it results in a loss in production.
12. Lignin is difficult to determine in a given sample. Technically not sufficiently suitable to use Lignin as a base for zero digestibility. Lignin is not a single entity. It sometimes has 10 to 15 percent digestibility.
13. Related work should accompany animal grazing tests. In a simple procedure when 15 to 20 items are included in the feed analysis, especially when the vitamins, and special minerals are included.
14. Year round grazing is hoped for on a farm basis. What affect will such a system have on ultimate production. Yield per unit of land. Maximum yield of livestock production, etc.
15. The ultimate of pasture is the main source of feed -- Calories and T.D.N. -- Pasture is sometimes used merely as a supplement to a feeding program, and as such has a real value. Experiments will need to consider the place of supplements.
16. There was a general discussion on breeding objectives with the animals. Whether there needs to be a change in type to more effectively fit the animal into a grassland type of agriculture.
17. The kind of livestock should be related to the needs of the area. The calf crop is often a good measure.
18. There was a brief and spirited discussion on the planning and statistical analysis of pasture experiments, particularly as related to the number of variables involved. It was generally agreed that methods and technique for continuing pasture experiments need to be experimentally evaluated, as well as the forages, pastures, and livestock.
19. Most experimental work seems to mix fundamental and empirical studies. Experimental work is often confounded with statistics. Earlier we have been masters of statistics, now there is a tendency to be servants of statistics. The objectives of the experimental work should emphasize the need for information that will help the crops and livestock industry.

Executive Committee meeting on Southern Pasture and Forage Crop
Conference in 1949

A luncheon conference relative to the 1949 meeting of this group was held at the request of Dr. T. Jackson Smith. Those present, in addition to Dr. Smith, were Messrs. Lovvorn, Woodhouse, Hanson, and Aamodt.

The group was looking forward to having the Conference at Raleigh this year and suggested that the best time would probably be around the middle of June. Three tentative topics for discussion at the Conference were suggested, in addition to the local field trips. They were as follows: (1) The place of statistics in pasture and forage crop research; (2) The present status of Ladino and tall fescue in the South; and (3) The present status of alfalfa production and improvement in the Southeastern States.

It was questionable whether there would be sufficient conference time for more than two of the above topics. Copies of this memorandum are being forwarded to Messrs. T. Jackson Smith, Roy L. Lovvorn, and Paul Henson. It is expected that Paul Henson will follow up on this memorandum with further suggestions relative to plans for the forthcoming meeting in June 1949.

Tour of Experiment Station Plots and Shops
at the Delta Branch Station

Summary of experiment work in progress	Supt.C. R. Sayre
Alfalfa plots	Dr. Johnson Mr. Carr
Forage crops' plots	Dr. Hogg
Buckshot rotation	Dr. Hogg
Luncheon	
Experimental machinery - Station shop	Mr. Meek
Dairy pasture plots and small grain grazing .	Dr. Green Dr. Hogg
Soybean nursery	Mr. Henson Mr. Carr Dr. Johnson
Weber experimental pastures	Dr. Hogg

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REGISTRATION LIST
Southern Pasture and Forage Crop
Improvement Conference
1948

ALABAMA

Pearson, R. W.	Department of Agronomy University of Alabama	Auburn
Rogers, T. H.	Department of Agronomy University of Alabama	Auburn
Scholl, J. M.	Department of Agronomy University of Alabama	Auburn
Stewart, Ernest H.	Department of Agronomy University of Alabama	Auburn
Sturkie, D. G.	Department of Agronomy University of Alabama	Auburn

ARKANSAS

Donald, Leroy	Chemical Division Lion Oil Company	El Dorado
Easley, Tildon	University of Arkansas	Little Rock
Garman, W. H.	Department of Agronomy University of Arkansas	Fayetteville
McDaniel, C. L.	Chemical Division Lion Oil Company	El Dorado
Perkins, Wheeler R.	Department of Agronomy University of Arkansas	

FLORIDA

Hodge, Elmer M.	Range Cattle Station	Ona
Killinger, G. B.	Agricultural Experiment Station, Department of Agronomy University of Florida	Gainesville
Ritchey, Geo. E.	Agricultural Experiment Station	Gainesville
Warner, John D.	North Florida Experiment Station	Quincy
White, J. B.	North Florida Experiment Station	Wewahitchka

GEORGIA

Burton, Glenn W.	Coastal Plain Experiment Station	Tifton
Crowder, Leroy V.	Georgia Experiment Station	Experiment
DeVane, Earl H.	Coastal Plain Experiment Station	Tifton
Elrod, Julius M.	Georgia Experiment Station	Experiment
Robinson, B.P.	Coastal Plain Experiment Station	Tifton
Sell, O. E.	Department Animal Industry Georgia Experiment Station	Experiment
Stephens, J. L.	Coastal Plain Experiment Station	Tifton
Williams, John S.	Coastal Plain Experiment Station	Tifton

KENTUCKY

Fergus, E. W.	Department of Agronomy University of Kentucky	Lexington (19)
Henson, Lawrence	Department of Agronomy University of Kentucky	Lexington (19)

LOUISIANA

Campbell, R. S.	Southern Forest Experiment Station	New Orleans
Forbes, J. L.	Louisiana State University	Baton Rouge
Monroe, W. E.	Department of Agronomy	
	Louisiana State University	Baton Rouge
Owen, C. R.	Department of Agronomy	
	Louisiana State University	Baton Rouge

MARYLAND (U.S.D.A.)

Aamodt, O. S.	Plant Industry Station	Beltsville
Ellis, N. R.	Bureau of Animal Industry	Beltsville
Howe, Paul E.	Bureau of Animal Industry	Beltsville
McKee, Roland	Plant Industry Station	Beltsville

MISSISSIPPI

Anthony, J. L.	Department of Agronomy	
	Mississippi State College	State College
Bailey, E. H.	Potash Institute	State College
Bennett, H. W.	Department of Agronomy	
	Mississippi State College	State College
Carr, Robert B.	Delta Branch Experiment Station	Stoneville
Coleman, Russell	Director - Experiment Station	State College
Finkner, Morris S.	Department of Agronomy	
	Mississippi State College	State College
Gill, John	South Mississippi Experiment Station	Poplarville
Hannons, J. G.	Department of Agronomy	
	Mississippi State College	State College
Henson, Paul R.	Delta Branch Experiment Station	Stoneville
Hogg, Peter G.	Delta Branch Experiment Station	Stoneville
Hoover, C. Dale	Delta Branch Experiment Station	Stoneville
Johnson, Henry	South Mississippi Experiment Station	Poplarville
Johnson, Howard W.	Delta Branch Experiment Station	Stoneville
Jones, U. S.	Department of Agronomy	
	Mississippi State College	State College
Jordan, Howard V.	Mississippi State College	State College
Landrum, Russell T.	Holly Springs Experiment Station	Holly Springs
Means, Supt. Ray H.	Brown Loam Experiment Station	Oakley
Warren Jr., Jack A.	Magee Cooperative Gin	Magee

MISSOURI

Brown, E. Marion	108 Waters Hall	
	Agricultural Experiment Station	Columbia

NORTH CAROLINA

Cummings, R. W.	North Carolina State College	Raleigh
Dobson, S. H.	Department of Agronomy	
	North Carolina State College	Raleigh
Eladson, S. H.	North Carolina State College	Raleigh
Hanson, Clarence H.	Department of Agronomy	
	North Carolina State College	Raleigh
Klingman, G. C.	Department of Agronomy	
	North Carolina State College	Raleigh
Lovvorn, R. L.	Department of Agronomy	
	North Carolina State College	Raleigh

NORTH CAROLINA - (Continued)

Rigney, J. A.	Department of Statistics North Carolina State College	Raleigh
Scarborough, Ernest	North Carolina State College	Raleigh
Waugh, R. K.	Department of Animal Industry North Carolina State College	Raleigh
Woodhouse, Jr., W. W.	Department of Agronomy North Carolina State College	Raleigh

OKLAHOMA

Elder, W. C.	Department of Agronomy A. & M. University	Stillwater
Jones, M. D.	Department of Agronomy A. & M. University	Stillwater

SOUTH CAROLINA

Tabor, Paul	Soil Conservation Service	Spartanburg
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TENNESSEE

Ewing, John A.	Middle Tennessee Experiment Station	Columbia
Leasure, J. K.	Department of Agronomy University of Tennessee	Knoxville 16
Lush, R. H.	Department of Dairy University of Tennessee	Knoxville 16
Powers, H. A.	T. V. A.	Knoxville
Rogers, Howard T.	T. V. A.	Knoxville
Skold, L. N.	Department of Agronomy University of Tennessee	Knoxville 16

TEXAS

Johnston, J. R.	Texas Agricultural Experiment Station #5	Temple
Lancaster, Robert R.	Texas A. & M. College	College Station
Lewis, R. D.	Texas A. & M. College	College Station
Moncrief, James B.	Agricultural Experiment Station	Beaumont
Potts, R. C.	Texas A. & M. College	College Station
Schember, Victor B.	Texas A. & M. College	College Station
Weihing, Ralph M.	Agricultural Experiment Station	Beaumont

VIRGINIA

Henderson, R. G.	Virginia Experiment Station	Blacksburg
Shear, G. M.	Virginia Experiment Station	Blacksburg
Smith, T. Jackson	Virginia Experiment Station	Blacksburg

WASHINGTON, D.C.

Davis, J. B.	Production Marketing Administration U.S. Department of Agriculture	Washington
McVickars, M. H.	National Fertilizer Association	Washington

